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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/928,611	08/13/2001	Frank Xiaohui Li	55123P219	7525
8791	7590	11/26/2004	EXAMINER	
BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030			ZHENG, EVA Y	
			ART UNIT	PAPER NUMBER
			2634	

DATE MAILED: 11/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/928,611

Applicant(s)

LI ET AL.

Examiner

Eva Yi Zheng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 August 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/28/02.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. Figure 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 7-10 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Rother et al. (US 4,955,039).

a) Regarding claim 1, Rother et al. disclose a frequency converter comprising: (as shown in Fig. 1)

first (M2), second (M1), third (M3) and fourth (M4) mixers, each receiving a signal to be frequency converted;

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first (HA), second (N) and third (N) quadrature dividers, each quadrature divider receiving an input signal and providing an inphase (01 and 03) and a quadrature (02 and 04) component of the respective input signal;

the first quadrature divider receiving an oscillator signal (OS) and providing inphase and quadrature components of the oscillator signal as inputs to the second and third quadrature dividers, respectively (as shown in Fig. 1);

the inphase and quadrature component outputs of the second quadrature divider providing signals to pump the second and first mixers, respectively (Col 2, L 34-44);

the inphase and quadrature component outputs of the third quadrature divider providing pumping signals to the fourth and third mixers, respectively (Col 2, L 34-44);

the first and fourth mixers providing quadrature components for combining to provide a quadrature frequency converter output (p'' and OU; Abstract); and

the second and third mixers inphase and out-of-phase components, respectively, for combining to provide an inphase frequency converter output (P' and IP; Abstract).

b) Regarding claim 10, Rother et al. disclose a method of frequency conversion comprising: (as shown in Fig. 1)

providing four signals to pump four mixers (M1, M2, M3 and M4), the four pumping signals being respective outputs of two quadrature dividers (N and N in block O), each having as an input, a respective output of a third quadrature divider (HA) receiving an oscillator signal as an input (OS);

providing a frequency to be converted to all four mixers (as shown in Fig. 1); and

combining the outputs of two pairs of the four mixers to provide the inphase and the quadrature components of the frequency converted signal ( $p'$  and  $p''$ ).

- c) Regarding claims 7 and 16, Rother et al. disclose the signal to be converted is an RF signal (E in Fig. 1).
- d) Regarding claims 8 and 17, Rother et al. disclose the mixer outputs are baseband signals (Abstract)
- e) Regarding claims 9 and 18, Rother et al. disclose the oscillator is a local oscillator (as shown in block O of Fig. 1).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-6 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rother et al. in view of Ashby (US 5,861,781).

a) Regarding claims 2 and 11, Rother et al. disclose all the subject described above except for the specific teaching of the mixers and the quadrature dividers are formed as part of a signal integrated circuit.

Ashby, in the same field of endeavor, teaches a double quadrature modulator implement in integrated circuit (Fig. 5; Col 4, L 23-25).

It is well known that integrated circuit (IC) technology is widely used in communication devices and systems. Therefore, it is obvious to one of ordinary skill in art at the time of invention to implement the quadrature receiver system by Rother et al. in IC. By doing so to reduce communication device size, better receiving quality, and improve quadrature components performance.

- b) Regarding claims 3 and 12, Rother et al. disclose the mixers are fabricated by replication of the same mixer circuit (as shown in Fig. 1).
- c) Regarding claims 4 and 13, Rogher et al. disclose the quadrature dividers are fabricated by replication of the same quadrature divider circuit (as shown in Fig. 1).
- d) Regarding claims 5 and 14, Rother et al. disclose the mixers and quadrature dividers are fabricated by replication of the same mixer and quadrature divider circuits, respectively (as shown in Fig. 1).
- e) Regarding claims 6 and 15, Rother et al. disclose all of the subject described above except for the specific teaching of a quadrature combiner coupled to the output of the mixers.

Ashby, in the same field of endeavor, teaches a double quadrature modulator (500 in Fig. 5) has a sum (S9 in Fig. 5) couples to mixers in order to produce a signal side-band signal.

Although Rother et al. didn't explicitly show a combiner for inphase and quadrature components, it is obvious to one of ordinary skill in art to understand and recognize that a combiner must be employed at the output of Rother's quadrature

receiver to form a signal side-banded signal. By doing so, provide better signal modulation, reduce undesired signal, and improve communication system.

6. Claims 2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rother et al. in view of Mole et al (US 6,226,509 B1).

Regarding claims 2 and 11, Rother et al. disclose all the subject described above except for the specific teaching of the mixers and the quadrature dividers are formed as part of a signal integrated circuit.

Mole et al. in the same field of endeavor, teaches a quadrature modulator implement in integrated circuit (Fig. 3; Col 1, L5-11).

With an increasing demand by the general public for smaller and more ergonomic designs, telecommunication equipment manufacturers have sought higher levels of functional integration within their respective integrated circuit designs (Mole; Col 1, L14-18). It is well known that integrated circuit (IC) technology is widely used in communication devices and systems. Therefore, it is obvious to one of ordinary skill in art at the time of invention to implement the quadrature receiver system by Rother et al. in IC. By doing so to reduce communication device size, better receiving quality, and improve quadrature components performance.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Yi Zheng whose telephone number is (571) 272-3049. The examiner can normally be reached on 7:30-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-879-9306.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**


**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Eva Yi Zheng  
Examiner  
Art Unit 2634

November 17, 2004

  
**SHUWANG LIU**  
**PRIMARY EXAMINER**